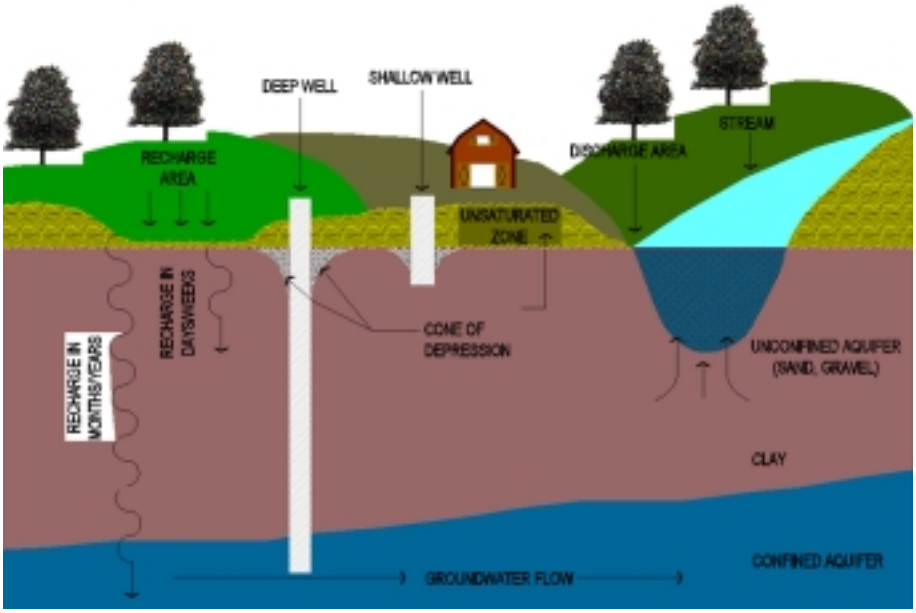
GROUNDWATER

Groundwater is water that seeps into the ground and collects in cracks and spaces in soil, sand and rocks. Groundwater is stored in, and moves slowly through, layers of soil, sand and rocks that are underground reservoirs called aquifers. Aquifers are not unlimited, therefore recharge is necessary to maintain water levels in aquifers (See Map 7, Groundwater Salinity Map).

Groundwater recharge is water that infiltrates into the water table. The sustainable yield of an aquifer is controlled by the quantity of recharge it receives. If total discharge exceeds recharge, water levels in an aquifer will diminish.

A number of variables affect groundwater and its recharge, including soil type and condition, geology and hydrology, precipitation, runoff, and topography.



Although groundwater quality in Nebraska is generally high, many cases of groundwater contamination have been documented. The high salinity in the north and north-western portion of Lancaster County causes salt-water intrusion and contaminates water. Other potential sources of groundwater contamination include agricultural activities, industrial facilities, leaking underground storage tanks, oil or hazardous substance spills, solid waste landfills, wastewater lagoons, and septic systems.

Data Sources

Sources for this section come from the Environmental Protection Agency's Toxic Release Inventory. Information also comes from the 1980 Lancaster County Soil Survey, and 1990 Historic and Ecological Resources Survey from the Lincoln-Lancaster County Ecological Advisory Committee.

County Level Patterns and Perspectives

Groundwater is the primary source of water in Lancaster County. While groundwater is an important source of water in the County, the City of Lincoln receives water that is as

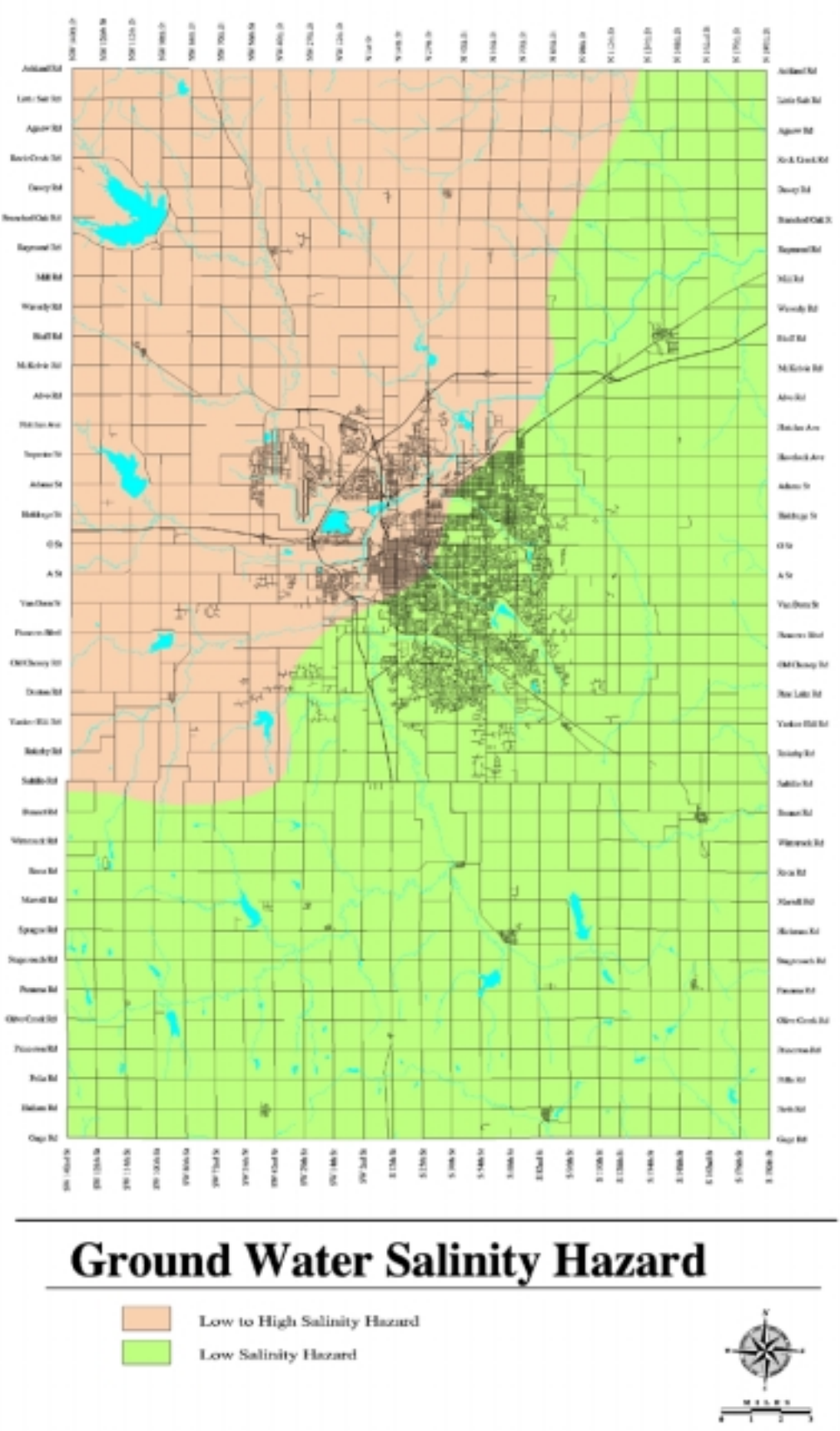


Image by: Lincoln-Lancaster County Planning Department

Map 7

pumped from the Platte River by the Ashland Treatment Plant. Water that is pumped at Ashland is then piped about 25 miles to the City of Lincoln pumping stations where it is distributed to customers in the City of Lincoln service area.

Groundwater within the County is used for irrigation as well as drinking water through rural wells. Approximately 49% of the groundwater in the County is used for domestic use, while about 15% is used for irrigation. Pennsylvanian Limestone, Dakota Sandstone, and Quaternary sediments are the major aquifers that provide sources of water in the County. In general, Pennsylvanian Limestone is an insufficient source of water and has low yields. The Dakota Sandstone provides storage of water for domestic, industrial and limited irrigation purposes. Although the Dakota Sandstone provides storage of quality water in some parts of the county, some is too salty for consumptive use. Salinity is high in several northern areas of the county beneath sections of Little Salt Creek. On the other hand, Quaternary sediments provide sufficient storage of water for irrigation, domestic and livestock use. Generally, water from Quaternary sediments is good quality, but many wells exceed acceptable mineral contents for some uses.

Photo: Lindsay Manufacturing Co. (www.zimmatic.com)

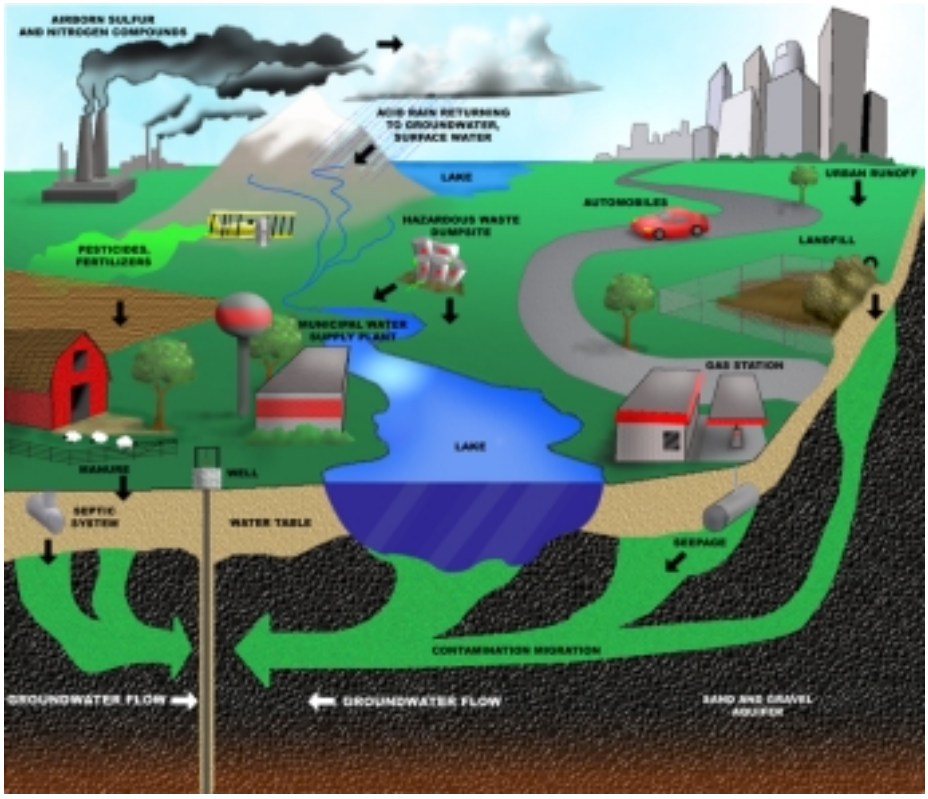
Photo: NEBRASKAland Magazine / Nebraska Game and Parks Commission

Three groundwater reservoirs are located in Lancaster County: the Waverly Groundwater Reservoir, the Dwight-Valparaiso Groundwater Reservoir and the Crete-Princeton-Adams Groundwater Reservoir.

Drinking water is primarily provided through three water systems in Lancaster County: the City of Lincoln, Lancaster County Rural Water District Number 1, and Cass County Rural Water District Number 2. There is some overlap between the City of Lincoln and Lancaster County Rural Water District service limits. These districts supply water to area customers within their service. Residents and towns outside the boundaries of these water districts utilize individual groundwater wells as the primary source of their water supply.

Environmental Imperatives and Planning Implications

Because groundwater is the primary source of water in Lancaster County, groundwater contamination is a serious issue. Sources of groundwater contamination are ever present. Substances used to maintain attractive landscaping, automobile maintenance, as well as chemicals to enhance crop production are harmful to water quality. Pesticides and fertilizers can seep into groundwater supplies over time. Road salt and used motor oil may seep into groundwater.



When excessive agricultural runoff from animal production facilities infiltrates the groundwater, increased nitrate levels endanger public health. In addition, it is possible for untreated waste from septic tanks and toxic chemicals from underground storage tanks to contaminate groundwater.

Salt-water intrusion causes many problems in northern and western Lancaster County, perhaps the most severe being the limitation of quality drinking water. The encroachment of salt water into fresh water supplies has become cause for concern as the population has risen in this area and placed greater demands on groundwater. Salinity in irrigation water can also be detrimental to agriculture by reducing yields and killing crops.

Contaminated groundwater can cause serious health effects. Diseases such as hepatitis and dysentery may be caused by contamination from septic tank waste. In addition, wildlife and agricultural crops can be poisoned by contaminated groundwater. It is important to consider the various ramifications of polluted groundwater for growth patterns in the County.

Lancaster County has one Superfund Site, according to the US Environmental Protection Agency. The site is located in the City of Waverly. Operation and maintenance of the groundwater treatment system in Waverly continued through 1998. Several toxic releases have been recorded in the County. The US Environmental Protection Agency can provide additional information regarding toxic releases.

To help protect Lancaster County's surface and groundwater resources, Groundwater Management Areas, created by the Lower Platte South Natural Resources District, have been established. These areas are used to develop management approaches best suited for each area.

Additional Research Needs

Understanding flow patterns and recharge zones will be useful in determining how to evaluate for growth in the County. Additionally, evaluating the size and extent of the salt-water intrusion problem is commonly accomplished through monitoring wells, which are used to determine the boundaries where salt/fresh water meet and the rate at which salinity levels increase. This will be necessary in the northwest portion of Lancaster County.